MOTOROLA

Level 2 Service Manual

6809492A18-B

E815, E816

Digital Wireless Telephone

CDMA 800/1900 MHz

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Introduction

Motorola® Inc. maintains a worldwide organization that is dedicated to provide responsive, full-service customer support. Motorola products are serviced by an international network of company-operated product-care centers as well as authorized independent service firms.

Available on a contract basis, Motorola Inc. offers comprehensive maintenance and installation programs that enable customers to meet requirements for reliable, continuous communications.

To learn more about the wide range of Motorola service programs, contact your local Motorola products representative or the nearest Customer Service Manager.

Product Identification

Motorola products are identified by the model number on the housing. Use the entire model number when inquiring about the product. Numbers are also assigned to chassis and kits. Use these numbers when requesting information or ordering replacement parts.

Product Names

Product names are listed on the front cover. Product names are subject to change without notice. Some product names, as well as some frequency bands, are available only in certain markets.

Regulatory Agency Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause any harmful interference
- This device must accept interference received, including interference that may cause undesired operation

This class B device also complies with all requirements of the Canadian Interference-Causing Equipment Regulations (ICES-003).

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Computer Program Copyrights

The Motorola products described in this manual may include Motorola computer programs stored in semiconductor memories or other media that are copyrighted with all rights reserved worldwide to Motorola. Laws in the United States and other countries preserve for Motorola, Inc. certain exclusive rights to the copyrighted computer programs, including the exclusive right to copy, reproduce, modify, decompile, disassemble, and reverse-engineer the Motorola computer programs in any manner or form without Motorola's prior written consent. Furthermore, the purchase of Motorola products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license or rights under the copyrights, patents, or patent applications of Motorola, except for a nonexclusive license to use the Motorola product and the Motorola computer programs with the Motorola product.

About this Service Manual

Using this service manual and the suggestions contained in it assures proper installation, operation, and maintenance. Refer questions about this manual to the nearest Customer Service Manager.

Audience

This service manual aids service personnel in testing and repairing E815 telephones. Service personnel should be familiar with electronic assembly, testing, and troubleshooting methods, and with the operation and use of associated test equipment.

Use of this manual assures proper installation, operation, and maintenance of Motorola products and equipment. It contains all service information required for the equipment described and is current as of the printing date.

Scope

This manual provides basic information relating to E815 telephones, and also to provides procedures and processes for repairing the units at Level 1 and 2 service centers including:

- Unit swap out
- Repairing of mechanical faults
- Basic modular troubleshooting
- Testing and verification of unit functionality
- Initiate warranty claims and send faulty modules to Level 3 or 4 repair centers

Conventions

The following special characters and typefaces are used in this manual to emphasize certain types of information.

Note: Emphasizes additional information pertinent to the subject matter.

Caution: Emphasizes information about actions that may result in equipment damage.

Warning: Emphasizes information about actions that may result in personal injury.

Keys to be pressed are represented graphically. For example, instead of "Press the Menu Key", you will see "Press ".

Information from a screen is shown in text as similar as possible to what displays on the screen. For example, ALERTS.

Information that you need to type is printed in **boldface type**.

Warranty Service Policy

The product is sold with the standard 12-month warranty terms and conditions. Accidental damage, misuse, and extended warranties offered by retailers are not supported under warranty. Non warranty repairs are available at agreed fixed repair prices.

Out-of-Box Failure Policy

The standard out of box failure criteria applies. Customer units that fail very early on after the date of sale, are to be returned to Manufacturing for root cause analysis, to guard against epidemic criteria. Manufacturing will bear the costs of early life failure.

Product Support

Customer's original units will be repaired but not refurbished as standard. Appointed Motorola Service Hubs will perform warranty and non-warranty field service for level 2 (assemblies) and level 3 (limited PCB component). The Motorola High Technology Centers will perform level 4 (full component) repairs.

Customer Support

Customer support is available through dedicated Call Centers and in-country help desks. Product Service training is available through the local Motorola Support Center.

Parts Replacement

When ordering replacement parts or equipment, include the Motorola part number and description used in the service manual or supplement.

When the Motorola part number of a component is not known, use the product model number or other related major assembly along with a description of the related major assembly and of the component in question.

In the U.S.A., to contact Motorola, Inc. on your TTY, call: 800-793-7834

Accessories and Aftermarket Division (AAD)

Order replacement parts, test equipment, and manuals from AAD.

U.S.A.	**Outside U.S.A.**
Phone: 800-422-4210	Phone: 847-538-8023
FAX: 800-622-6210	FAX: 847-576-3023

Website: http://businessonline.motorola.com

EMEA

Phone: +49 461 803 1404

Website: http://emeaonline.motorola.com

Asia

Phone: +65 648 62995

Website: http://asiaonline.motorola.com

Specifications

General Function	Specification
Frequency Range 1900 MHz PCS	1931.250 -1988.750 MHz Rx 1851.250 -1908.750 MHz Tx
Frequency Range 800 MHz CDMA	869.04 - 893.97 Rx 824.04 - 848.97 Tx
Channel Spacing	50 kHz PCS 30 kHz CDMA
Channels	1200 PCS 832 CDMA
Modulation	1M25D1W (1.25 MHz bandwidth) CDMA 3G1XRTT (1.25 MHz bandwidth) CDMA-1X
Transmitter Phase Accuracy?	5 Degrees RMS, 20 Degrees peak
Duplex Spacing	80 MHz PCS
Frequency Stability	± 300 Hz (CDMA) ± 2.5 ppm (CDMA)
Power Supply	3.6V Li Ion 750 mAh battery
Average Transmit Current	310 mA at +13 dBm)
Average Stand-by Current	3.40 mA
Dimensions (with 750 mAh Li ion battery)	94.3mmX49.6mmX24.4mm 3.7 in. x 1.9 in. x 0.9 in.
Size (Volume)	88 cc (5.37 $in.^3$) without antenna
Weight	≤132g (4.65 oz) with battery
Temperature Range	-30° C to +60° C (-22° F to +140° F)
Humidity	80% Relative Humidity at 50° C (122° F)
Battery Life, 750 mAh Li Ion Battery	Up to 180 minutes digital talk time (IS 95 A/B) Up to 250 hours (IS 95 A/B) standby time Up to 350 hours (IS 2000) standby time
	All talk and standby times are approximate and depend on network configuration, signal strength, and features selected.

Transmitter Function	Specification
RF Power Output	0.20 watts -23 dBm into 50 ohms (CDMA nominal)
Input/Output Impedance	50 ohms (nominal)
Transmit Audio Response	6 dBm/octave pre-emphasis
Modulation	1M25DIW (1.25 MHz bandwidth) CDMA
CDMA Transmit Waveform Quality (Rho)	0.94

Receiver Function	Specification
Receive Sensitivity	-104 dBm (CDMA, 0.5% Static FER) 0.5% or less
Audio Distortion	Less than 5% at 1004 Hz, +/- 8 kHz peak frequency deviation (transmit and receive)
Adjacent and Alternate Channel Desensitization	3% BER max at 107 dBm signal; -94 dBm/30 kHz, -65 dBm/60 kHz

Product Overview

Motorola E815 mobile telephones feature Code Division Multiple Access (CDMA) technology. The mobile telephone uses a simplified icon and Graphical user interface (GUI) for easier operation, allow Short Message Service (SMS) text messaging, and include clock, alarm, datebook, calculator, and caller profiling personal management tools. The E815 also has a built in 1.3 Megapixel camera, Bluetooth wireless connectivity. The phone provides 32 Embedded ring tones including VibraCall vibrating alert and 32 Downloadable/Customizable iMelody ring tones. The phone also contains a TransFlash removable memory expansion slot. The E815 is a dual band phone that allows roaming within the CDMA 800 and 1900 MHz bands.

The E815 CDMA phone consists of a main housing assembly and a flip assembly. The housing assembly contains the battery, battery cover, headset jack, accessory connector, main circuit board, chassis, keypad, and retractable antenna. The main display and camera are located in the hinged flip assembly.

The main circuit board contains the Receiver, Transmitter, Synthesizer and Control Logic Circuitry which together comprise the dual band tri-mode phone electronics.

The flip assembly contains the entire hinge mechanism. It is attached to the main housing by four screws. The main display is located on the inside of the flip assembly and a one line LCD display on the outside of the flip assembly. The main display is a 128 x160 pixel, 262K color TFT LCD. The external display is a 96x39 pixel, 4-color OLED. The camera is a 1.3 mega pixel, VGA CMOS Sensor Camera.

The telephones are made of polycarbonate plastic with a metal enclosure. The display and speaker, as well as the 18-key keypad, transceiver printed-circuit board (PCB), microphone, charger and headphone connectors, and power button are contained within the flip form-factor housing. The 750 mAh Lithium Ion (Li Ion) battery provides up to 240 minutes of talk time in CDMA mode with up to 264 hours of standby time[1].

Features

E815 telephones use advanced, self-contained, sealed, custom integrated circuits to perform the complex functions required for CDMA communication. Aside from the space and weight advantage, microcircuits enhance basic reliability, simplify maintenance, and provide a wide variety of operational functions.

Features available in this product include:

- Video on Demand (VoD) via Packet Video BREW application (Verizon only)
- 1.3 Megapixel Camera with Light
- 4 different types of resolution (1248x960, 640X480, 320X240, 160X120)
- Bluetooth Connectivity
- Multi-Media Messaging (MMS)
- Video clip capture & playback
- Self Portrait Viewfinder External Display
- 64 Polyphonic, 18mm Office Quality Speaker Phone, Stereo Headset Support
- Integrated MP3 Player, MP3 and MIDI Ringers
- 40 MB User Storage (approximately)

1. All talk and standby times are approximate and depend on network configuration, signal strength, and features selected. Standby times are quoted as a range from DRX=2 to DRX=9. Talk times are quoted as a range from DTX off to DTX on.

- Picture Caller ID on External & Internal Display
- Digital Camera Features: Photo Album, Slide Show Viewer, 4X Digital Zoom, Auto Timer, Shutter Tones, Adjustable Resolution, Day & Night Lighting Modes, 4 Image Styles.
- Picture phone book.
- Digital Camcorder Features: Adjustable video length for up to 3 minutes, Recording sound on/off option, Adjustable video quality, Day & Night Lighting Modes
- TransFlash Memory Expansion Slot
- Enhanced Speaker Independent Voice Recognition
- Text to Speech enabled phonebook & keypad
- PIM functionality, PC Sync with optional Mobile Phone Tools Software, Predictive Text (iTAP), 1000 Multi-fielded Phonebook Entries, Voice Memo, Currency Converter, Calculator
- AFLT/aGPS location services[2]

Simplified Text Entry

iTAP™ predictive text entry. Press a key to generate a character and a dynamic dictionary uses this to build and display a set of word or name options. The iTAP™ feature may not be available in all languages.

Personal Information Management

The E815 telephone contains a built in calendar with alarm reminders message center and a 1000 number capacity phonebook. Phonebook and calendar can be synchronized with a PC using optional Mobile Phone tools software.

2. Network, subscription or service provider dependent feature. Not available in all areas.

General Operation

Controls, Indicators, and Input/Output (I/O) Connectors

The E815 telephones' controls are on the front and side of the device, and on the keyboard as shown in Figure 1. Other hardware features are shown in Figure 2.

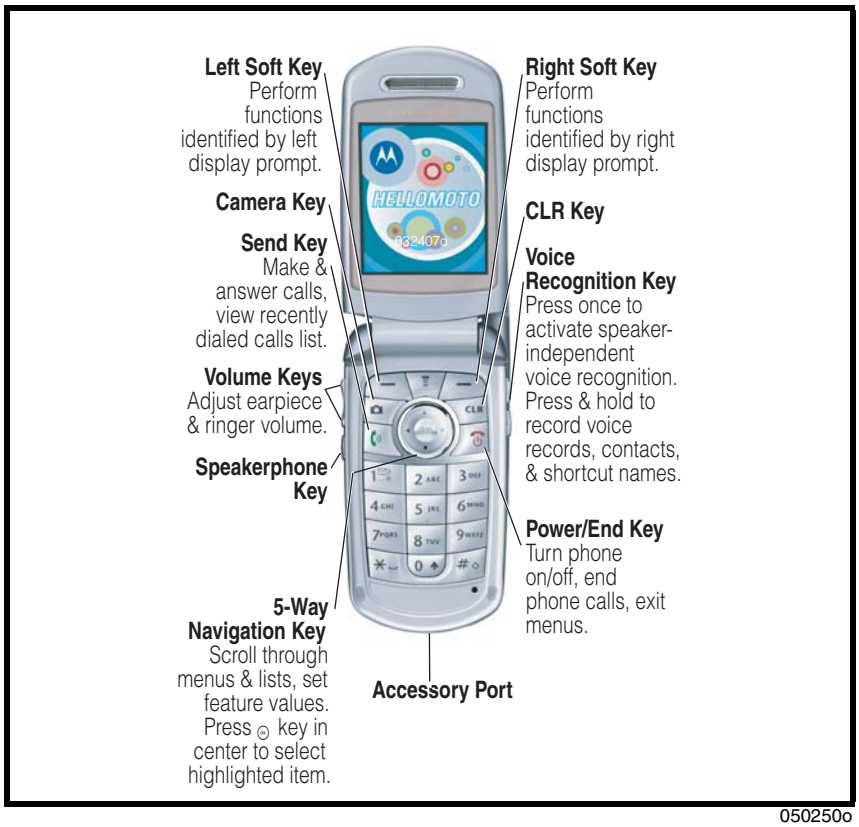
Left Soft Key
Perform functions identified by left display prompt.
Camera Key
Send Key
Make & answer calls, view recently dialed calls list.
Volume Keys
Adjust earpiece & ringer volume.
Speakerphone Key
5-Way Navigation Key
Scroll through menus & lists, set feature values. Press ⊙ key in center to select highlighted item.
Right Soft Key
Perform functions identified by right display prompt.
CLR Key
Voice Recognition Key
Press once to activate speaker-independent voice recognition. Press & hold to record voice records, contacts, & shortcut names.
Power/End Key
Turn phone on/off, end phone calls, exit menus.
Accessory Port
HELLOMOTO
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Figure 1. Controls and Indicators Locations

Figure 2. External Hardware Features Locations

Menu Navigation

E815 telephones have a simple icon and GUI. The phone also features a user-definable Quick Access menu accessed by holding down the Menu key. A 5-way navigation key allows you to move easily through menus.

Color Display

The E815 phone features a 128 x160 pixel, 262K color display. The display provides constant graphical representations of battery capacity and signal strength, as well as the real-time clock.

Display animation makes the phone's icon menu move smoothly as the user scrolls up and down.

Whether a phone displays all indicators depends on the programming and services to which the user subscribes.

Figure 2 shows some common icons displayed on the LCD.

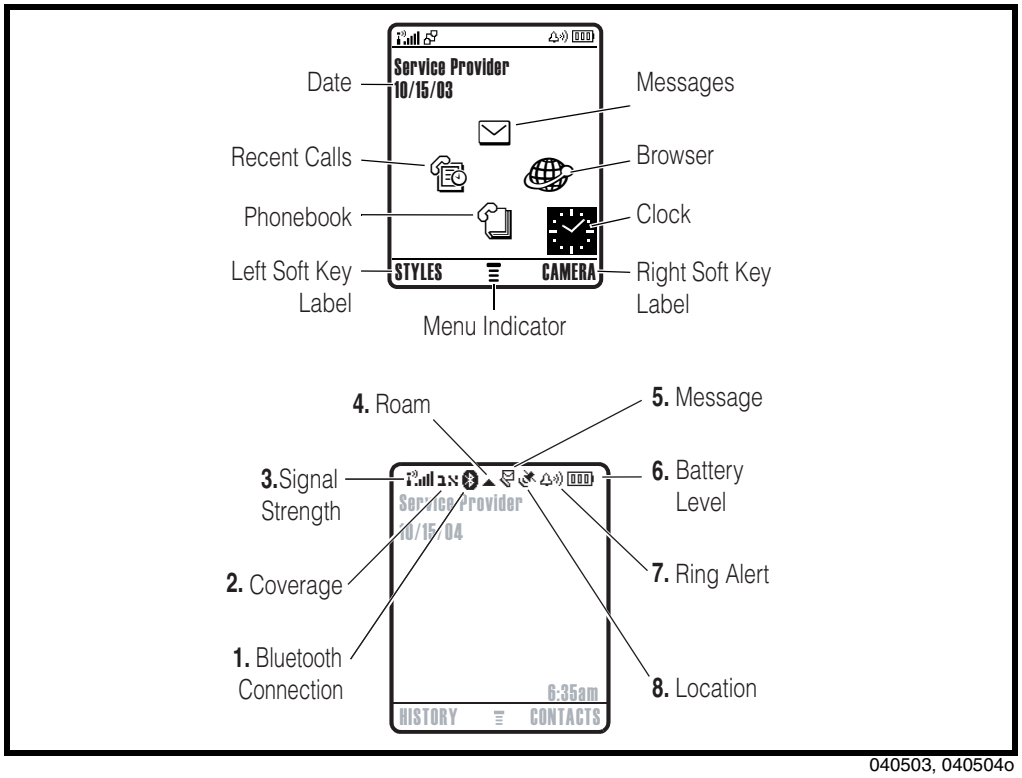

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Figure 3. Display Icon Indicators

Alert Settings

In addition to preset ring tones, E815 telephones allow the user to download additional ring tones. (Availability is carrier and Network dependant).

Motorola E815 phones incorporate the VibraCall® discreet vibrating alert that avoids disturbing others when a ringing phone is unacceptable.

Alerts can be set to ring only, vibrate only, vibrate then ring, or no ring or vibrate.

Additionally, the profiling feature allows users to identify incoming calls by a specific ringer tone.

Battery Function

Battery Charge Indicator

The telephone displays a battery charge indicator icon in the idle screen to indicate the battery charge level. The gauge shows four levels: 100%, 66%, 33%, and Low Battery.

Battery Removal

Removing the battery causes the device to shut down immediately and loose any pending work (partially entered phone book entries or outgoing messages, for

example). If battery is removed before the unit is fully powered down the display will not display properly until the unit is powered down correctly and then re-powered up. (Snowy screen).

All batteries can cause property damage and/or bodily injury such as burns if a conductive material such as jewelry, keys, or beaded chains touch exposed terminals. The conductive material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects.

If the battery is removed while receiving a message, the message is lost.

To ensure proper memory retention, turn the phone OFF before removing the battery. Immediately replace the old battery with a fresh battery.

Operation

For detailed operating instructions, refer to the appropriate User Guide listed in the Related Publications section toward the end of this manual.

Tools and Test Equipment

The following table lists tools and test equipment recommended for disassembly and reassembly of E815 and E816 telephones. Use either the listed items or equivalents.

Table 1. General Test Equipment and Tools

Motorola Part Number[1]	Description	Application
RSX4043-A	Torque Driver	Used to remove and replace screws
—	Torque Driver Bit T-6 Plus, Apex 440-6IP Torx Plus or equivalent	Used with torque driver
See Table 7	Rapid Charger	Used to charge battery and power phone
0180386A82	Antistatic Mat Kit (includes 66-80387A95 antistatic mat, 66-80334B36 ground cord, and 42-80385A59 wrist band)	Provides protection from damage to device caused by electrostatic discharge (ESD)
6680388B67	Disassembly tool, plastic with flat and pointed ends (manual opening tool)	Used during assembly/disassembly of phone
6680388B01	Tweezers, plastic	Used during assembly/disassembly
—	Digital Multimeter, HP34401A[2]	Used to measure battery voltage
6688054N01	Flip disassembly tool	Used to disassembly the flip assembly
SYN1241A	Black Stick	Used to pry the main display lens from the flip assembly
SYN1242A	Silver Metal Bezel	Used to open the phone

1. To order in North America, contact Motorola Aftermarket and Accessories Division (AAD) at (800) 422-4210 or FAX (800) 622-6210; Internationally, AAD can be reached by calling (847) 538-8023 or by fax (847) 576-3023.
2. Not available from Motorola. To order, contact Hewlett Packard at (800) 452-4844.

Disassembly

The procedures in this section provide instructions for the disassembly of an E815 or E816 telephone. Tools and equipment used for the phone are listed in Table 1, preceding.

Many of the integrated devices used in this phone are vulnerable to damage from electrostatic discharge (ESD). Ensure adequate static protection is in place when handling, shipping, and servicing the internal components of this equipment.

Avoid stressing the plastic in any way to avoid damage to either the plastic or internal components.

Removing the Battery Cover

1. Ensure the phone is turned off.
2. Slide the battery cover latch as shown in Figure 4.
3. Gently lift the top end of the battery cover away from the phone.
4. Lift the battery cover away from the phone.

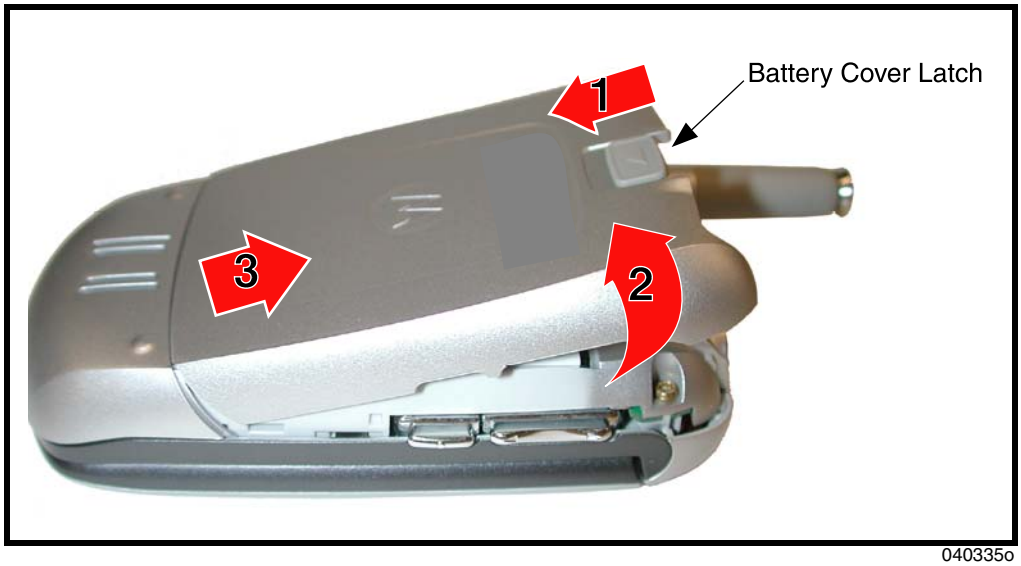

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Figure 4. Removing the Battery Cover

5. To replace, align the battery cover to the phone.
6. Slide the bottom end of the battery cover into the phone.
7. Lower the top end of the battery cover onto the phone until battery cover latch snaps into place.

Removing and Replacing the Battery

All batteries can cause property damage and/or bodily injury such as burns if a conductive material such as jewelry, keys, or beaded chains touch exposed terminals. The conductive material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects.

1. Ensure the phone is turned off.
2. Remove the battery cover as described in the procedures.
3. Lift the top of the battery near the antenna out of the battery compartment as shown in Figure 5.
4. Lift the battery out of the phone.

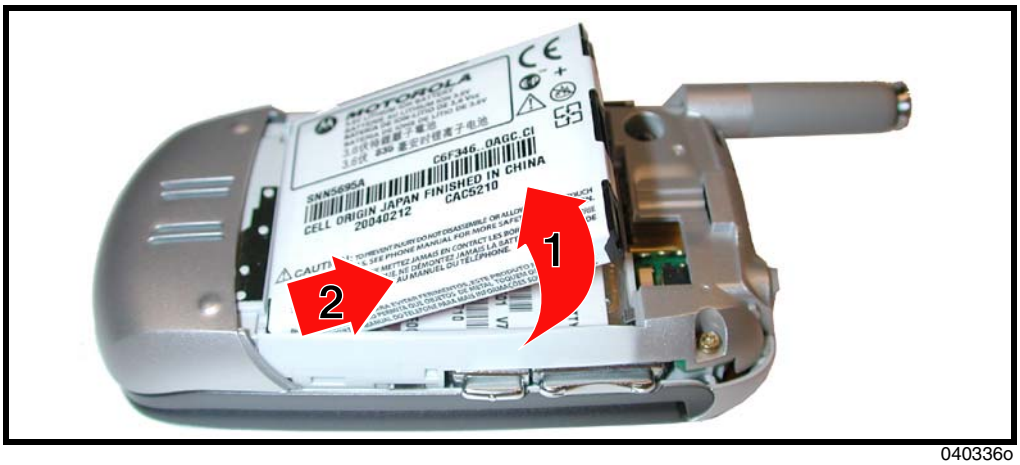

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Figure 5. Removing the Battery

5. To replace, align the battery with the battery compartment so the contacts on the battery match the battery contacts in the phone.
6. Insert the battery, printed arrow first, into the battery compartment and push down.
7. Insert the ridge at the bottom of the housing into the base of the phone, then push the battery down and snap it into place.

Removing and Replacing the Antenna

1. Remove the battery cover, and battery as described in the procedures.
2. By hand, rotate the antenna base counterclockwise, as indicated by the red arrows until loose.
3. When the antenna threads are completely disengaged, slide the antenna out of the housing. See Figure 6.

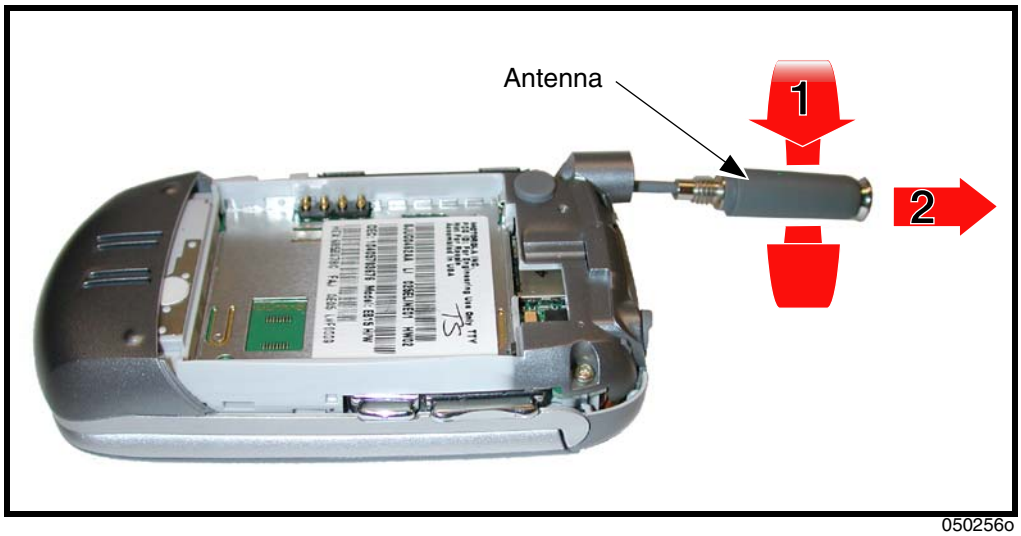

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Figure 6. Removing the Antenna

Ensure antenna threads are properly engaged before tightening to prevent damage to the antenna or housing.

4. To replace, insert the threaded end of the antenna carefully into the housing and, after ensuring the threads are properly engaged, rotate clockwise. Tighten firmly by hand.
5. Replace the battery, and battery cover as described in the procedures.

Removing and Replacing the Speaker Cover and Keypad Bezel

1. Remove the battery cover, battery, and antenna, as described in the procedures.
2. Turn the phone over and carefully insert the silver bezel tool under the keypad bezel and gently bend the bezel outward from the rear housing to release the 2 snaps on the side of the housing (See Figure 7).

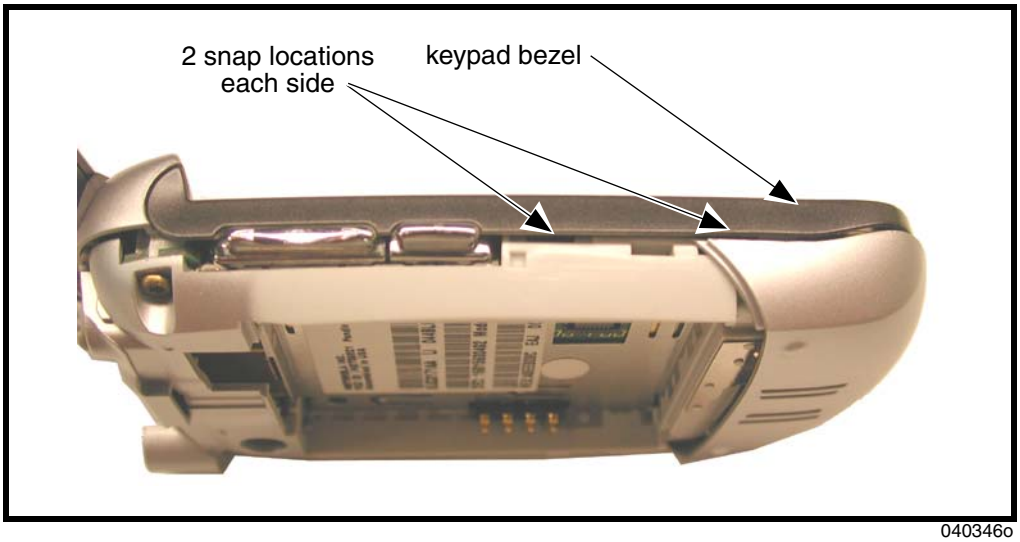

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Figure 7. Releasing the Keypad Bezel Latches

3. Repeat step 2 for the other side of phone.
4. When all four snaps have been released, insert the silver bezel tool under the outer edges of the speaker cover to release the latches on each side.

5. Slide the speaker cover toward the antenna to remove.

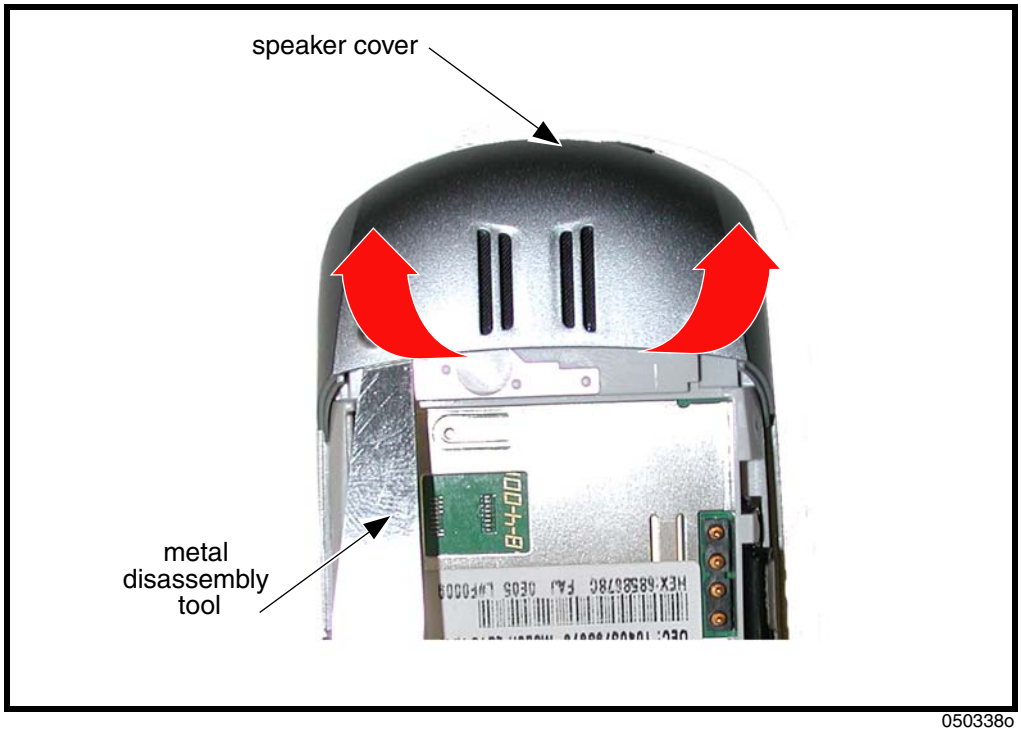

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Figure 8. Removing the Speaker Cover

6. Carefully lift the keypad bezel away from the phone.
7. To replace, slide the speaker cover onto the phone.
8. Gently press down on the sides of the speaker cover to engage the latches.
9. Align the keypad bezel with the phone housing.
10. Carefully press the keypad bezel into the phone housing until the snaps engage.
11. Replace the antenna, battery, and battery cover as described in the procedures.

Removing and Replacing the Keyboard Stiffener

1. Remove the battery cover, battery, antenna, keypad bezel, and speaker cover as described in the procedures.
2. Remove the two screws at the bottom of the phone near the polyphonic speaker (See Figure 9).

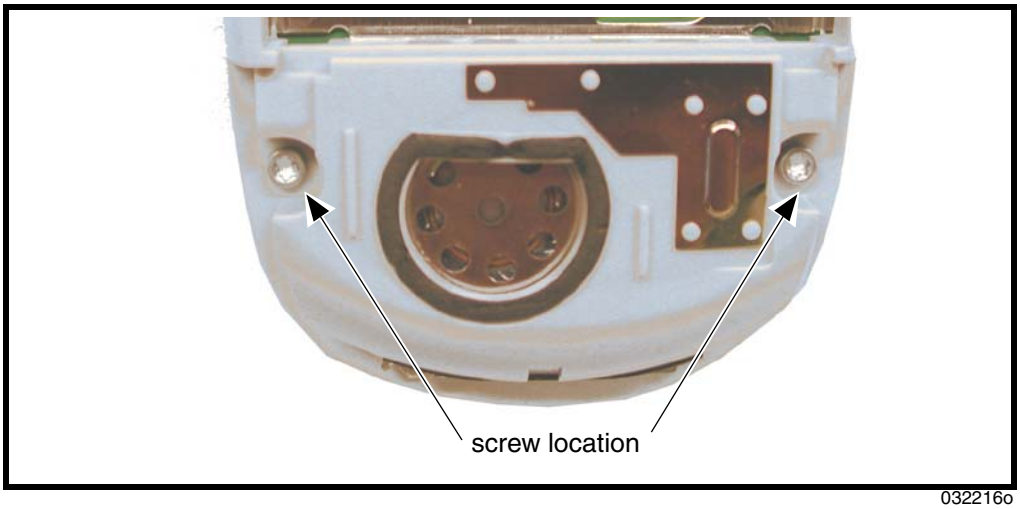

Figure 9. Removing the rear housing bottom screws

3. Lift the bottom end of the keyboard stiffener toward the flip knuckles.
4. Use the disassembly tool to disconnect the keypad flex connector (See Figure 10).

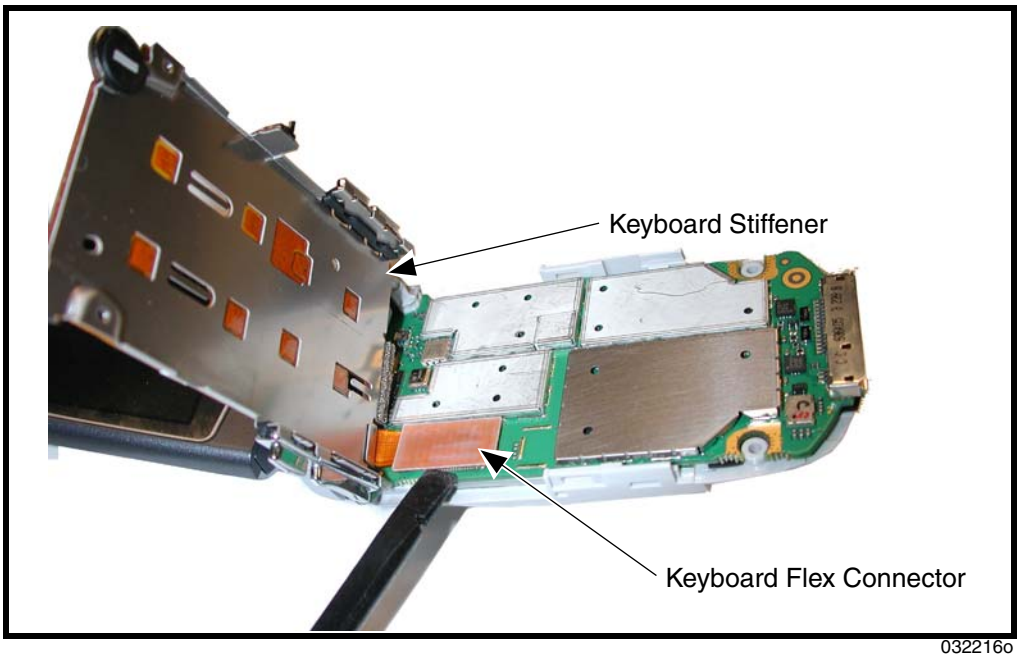

Figure 10. Removing the Keyboard Flex Connector

5. Lift the keyboard stiffener away from the phone.
6. To replace, align the keyboard stiffener to the transceiver board.
7. Connect the keyboard flex connector to its socket on the transceiver board.
8. Ensure that the tab at the north end of the keyboard stiffener is above the hinge flex. Then lower the keyboard stiffener onto the transceiver board. Keep the tab above the hinge flex, but do not engage the hooks until step 9.
9. With the keyboard stiffener almost parallel to the transceiver board engage the hooks on each side of the keyboard stiffener. Do not pull the keyboard stiffener away from the hinge flex any more than necessary to engage the hooks.
10. Lower the keyboard stiffener onto the transceiver board. When complete, the conductive pad should be compressed between the keyboard stiffener and the hinge flex, NOT bunched up between the hinge flex and the PCB.
11. Insert and tighten two screws near the polyphonic speaker assembly.
12. Replace the speaker cover, keypad bezel, antenna, battery, and battery cover as described in the procedures.

Removing and Replacing the Flip Assembly and Transceiver Board

1. Remove the battery cover, battery, antenna, keypad bezel, speaker cover, and keyboard stiffener as described in the procedures.
2. Use the T6 driver to remove the two flip assembly screws. Set the screws aside for reuse (See Figure 11).

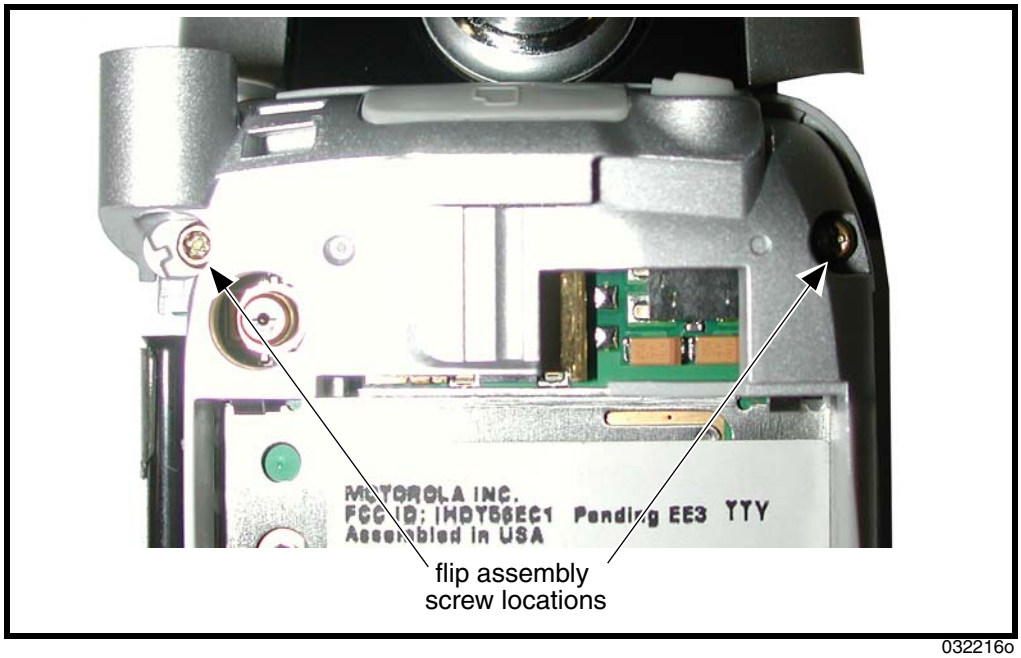

Figure 11. Removing the Flip Assembly Screws

3. Use the disassembly tool to disconnect the flip assembly flex connector. (See Figure 12).

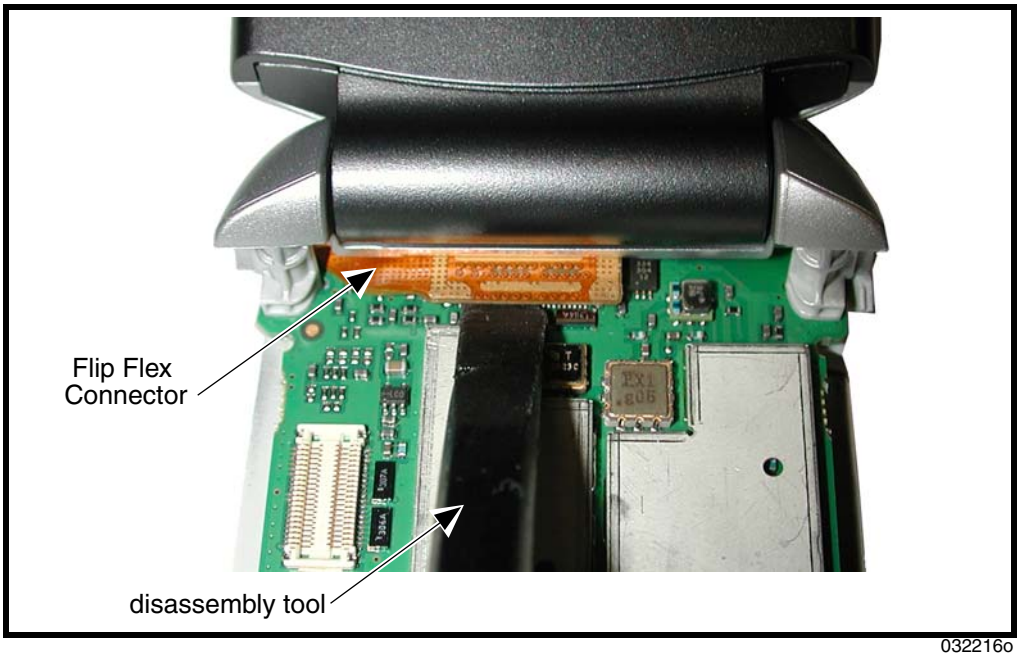

Figure 12. Removing the Flip Assembly Flex Connector

4. Carefully separate the flip assembly from the transceiver board and rear housing assembly.

This product contains static-sensitive devices. Use anti-static handling procedures to prevent electrostatic discharge (ESD) and component damage.

5. Turn the transceiver board and rear assembly over and lift the transceiver board away from the rear housing..

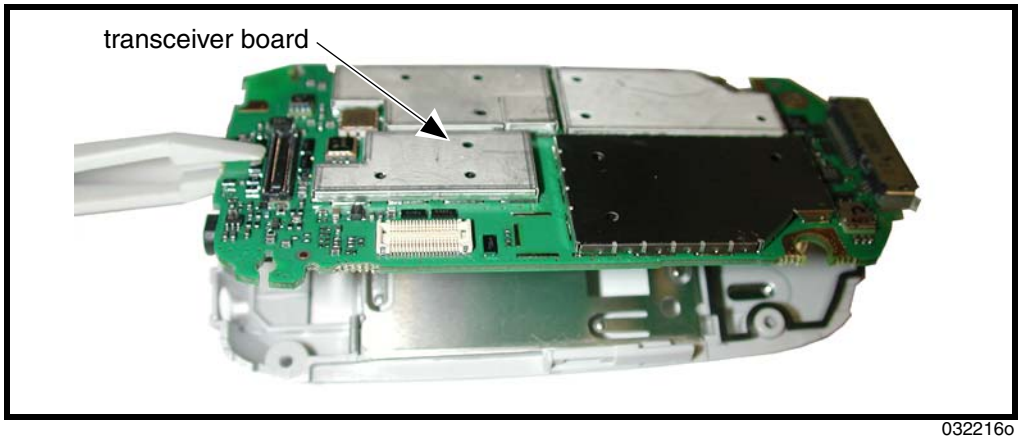

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Figure 13. Removing the Transceiver Board

6. To replace, align the transceiver board to the rear housing assembly and lower it into place on the rear housing.
7. With the flip assembly knuckles in the "flip open" position, align the flip assembly flex connector to the transceiver board.
8. Connect the flip assembly flex connector to its socket on the transceiver board.
9. Align the flip assembly screw bosses to the screw holes on the transceiver board.
10. Hold the assembly together and insert the flip assembly screws into the rear housing assembly and tighten to 14 Ncm (1.25 inch-pounds).
11. Replace the keyboard stiffener, speaker cover, keypad bezel, antenna, battery, and battery cover as described in the procedures.

Removing and Replacing the Flip Display Lens

1. Remove the battery cover, and battery as described in the procedures.
2. Insert the pointed edge of the disassembly tool into the seam between the main lens and the flip sleeve edge and pry up the main lens edge (see Figure 14).

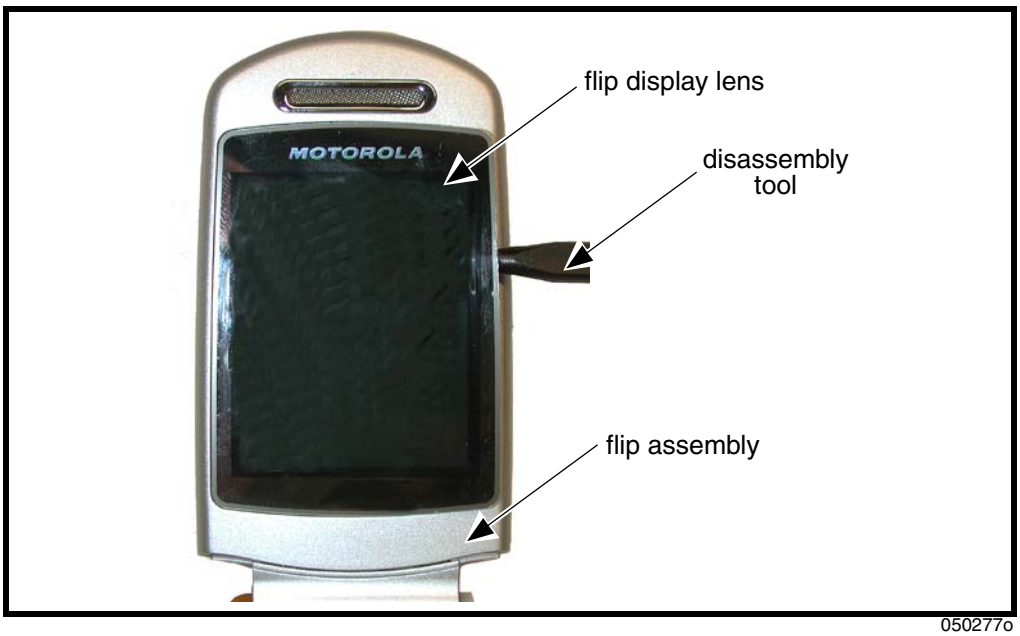


Figure 14. Removing the Flip Display Lens

3. Use the flat end of the disassembly tool into the gap and carefully separate the display lens from the flip assembly.
4. To replace, align the display lens to the flip assembly. Expose the display lens adhesive. Carefully press the display lens into position on the flip assembly.
5. Replace the transceiver board and flip assembly, keypad stiffener, speaker cover, keypad bezel, antenna, battery, and battery cover as described in the procedures.

Removing and Replacing the Flip Assembly Sleeve

1. Remove the battery cover, battery, and flip display lens as described in the procedures.
2. Grasp the flip assembly and pull firmly as indicated by the red arrows to remove the flip assembly sleeve (See Figure 15). Do not pry off the flip sleeve with the plastic disassembly tool, this will result in damage to the display printed flex cable.

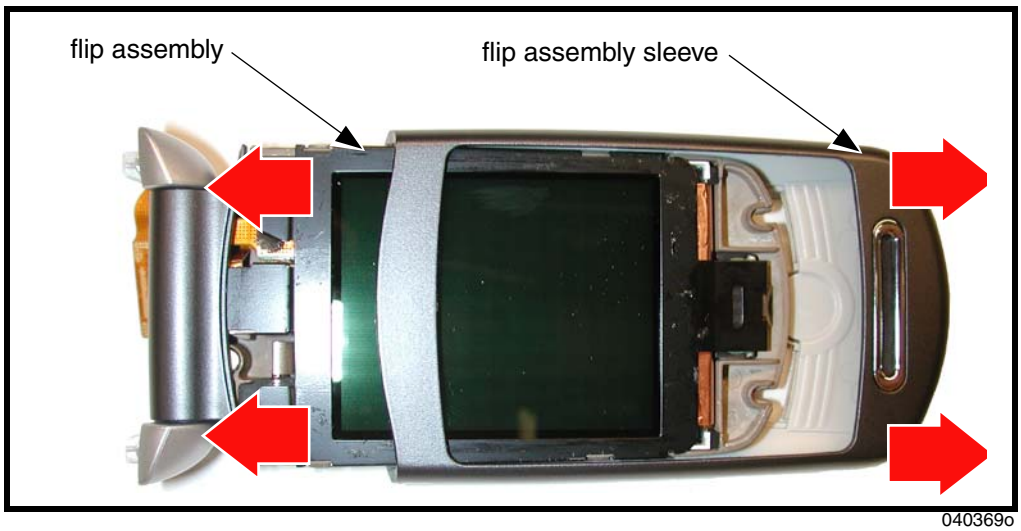


Figure 15. Removing the Flip Assembly Sleeve.

3. To replace, insert the flip assembly into the flip assembly sleeve and push firmly until the flip assembly is fully inserted into the flip assembly sleeve.
4. Replace the flip display lens, transceiver board, flip assembly, keyboard stiffener, speaker cover, keypad bezel, antenna, battery, and battery cover as described in the procedures.

Removing and Replacing the Flip Knuckle

1. Remove the battery cover, battery, antenna, keypad bezel, speaker cover, keyboard stiffener, flip assembly, transceiver board, flip display lens, and flip assembly sleeve as described in the procedures.

The flexible printed cable (FPC) (flex) is easily damaged. Exercise extreme care when handling.

2. Remove the knuckle by removing the hinge assembly side followed by the side where the flex is routed.
3. Carefully slide the display flex through the knuckle. Avoid damage to the display flex (see Figure 16).

040371o

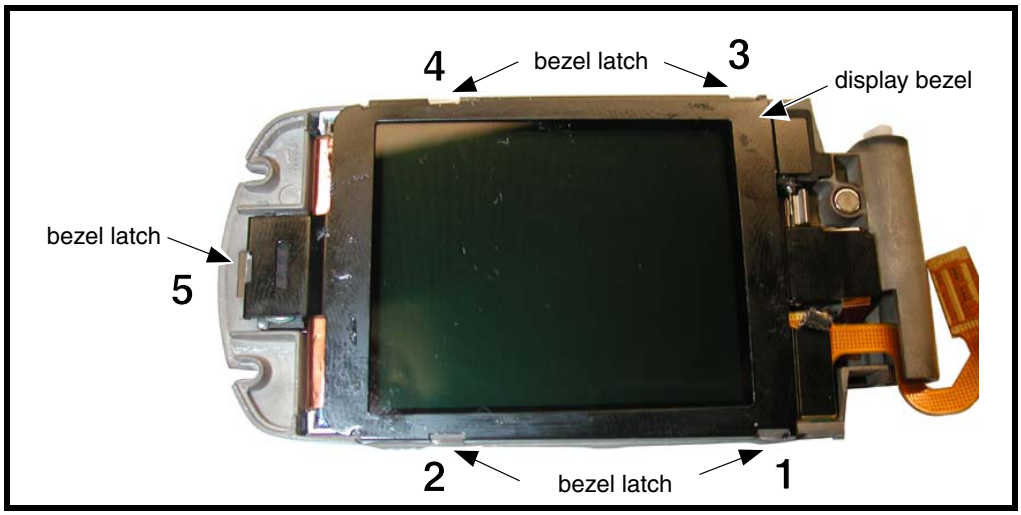
Figure 16. Removing the Knuckle.

Removing the Display Bezel

1. Remove the battery cover, battery, antenna, keypad bezel, speaker cover, keyboard stiffener, flip assembly, transceiver board, flip display lens, flip assembly, flip assembly sleeve, and flip knuckle as described in the procedures.

The flexible printed cable (FPC) (flex) is easily damaged. Exercise extreme care when handling.

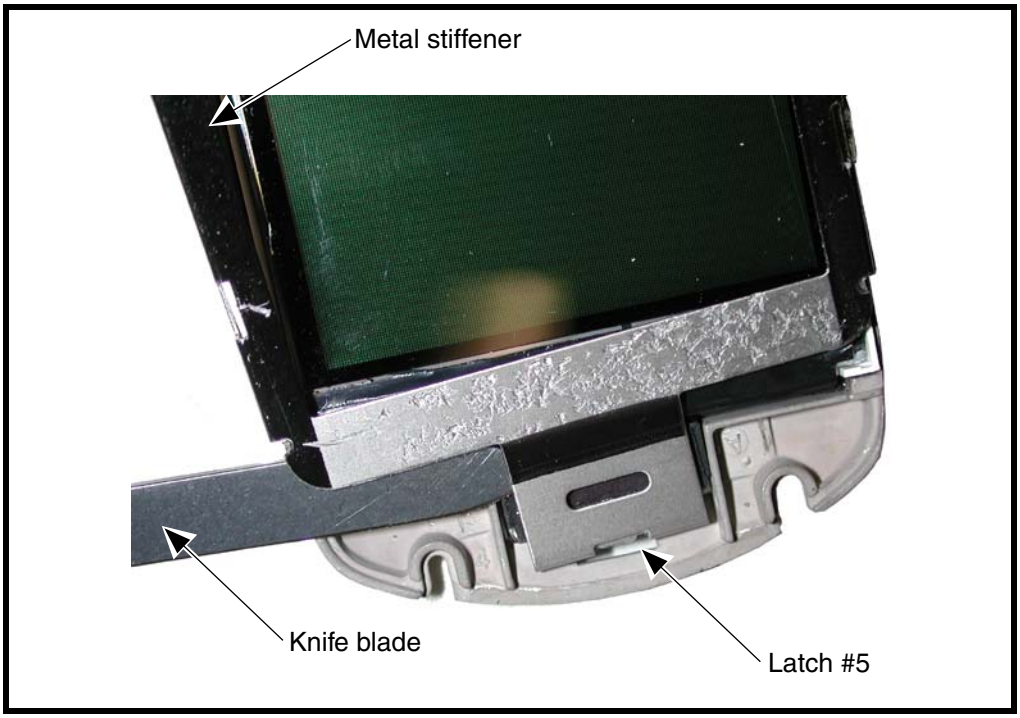
2. Use the metal tweezers to release the five latches in the sequence shown (see Figure 17).



032218o

Figure 17. Removing the Display Bezel

3. To prevent damage to the speaker, insert an Exacto knife blade between the metal stiffener and the earpiece gasket. Apply pressure to the speaker with the side of the blade and hold it firm.



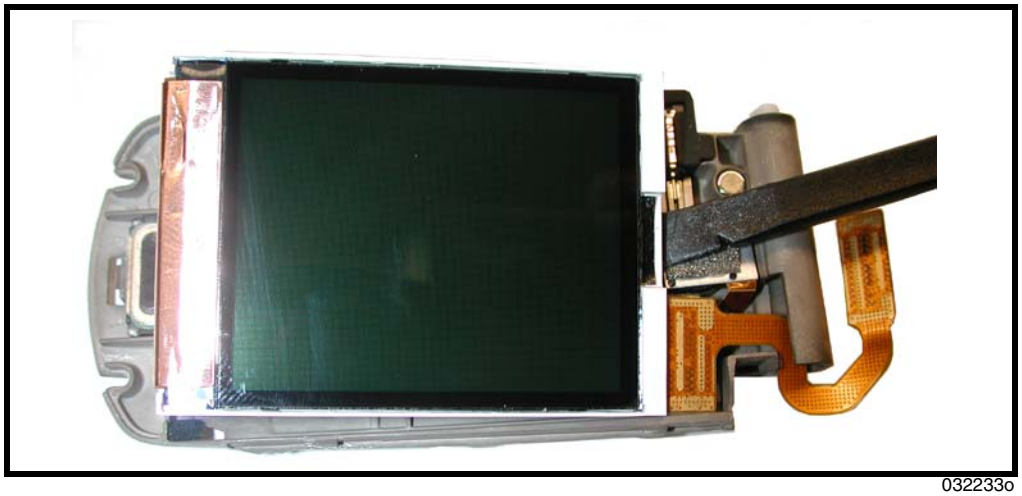
032218o

Figure 18. Removing the Display Bezel

4. Rotate the display bezel away from the barrel, pivoting on Latch #5 as shown in photo. Continue lifting until the metal stiffener separates from the speaker. Then, remove the Exacto knife blade.
5. Once the bezel has separated from the speaker, work the display bezel off latch# 5.
6. Remove old speaker gasket material. A new speaker gasket will be used for reassembly. Ensure that the felt cover on the speaker assembly is not damaged while removing the gasket material.
7. To replace, align the connector with it's socket on the transceiver board.
8. Gently press the flex connector into position onto the flex connector socket.
9. Lower the new display bezel over the display module. Gently and firmly press the latches into position. Ensure all the latches are engaged.
10. Replace the flip knuckle, flip assembly sleeve, flip assembly, flip display lens, transceiver board, flip assembly, keyboard stiffener, speaker cover, keypad bezel, antenna, battery, and battery cover as described in the procedures.

Removing the Display Assembly

1. Remove the battery cover, battery, antenna, keypad bezel, speaker cover, keyboard stiffener, flip assembly, transceiver board, flip display lens, flip assembly, flip assembly sleeve, flip knuckle, and display bezel as described in the procedures.
2. Use the disassembly tool to disconnect the flex connector from the display module assembly. Set the flex aside for reuse.
3. Gently pry the camera module up out of the camera bracket.
4. Carefully, lift the display module and the camera module up and away from the remainder of the flip assembly.



032233o

Figure 19. Removing the Display Assembly

5. To replace, align the camera module to the camera bracket.
6. Angle the display module upward while inserting the camera module into the camera bracket.
7. Seat the camera module into the camera bracket while pivoting the display module downward into place on the flip assembly.
8. Carefully re-connect the flex connector.
9. Replace the display bezel, flip knuckle, flip assembly sleeve, flip assembly, flip display lens, transceiver board, flip assembly, keyboard stiffener, speaker cover, keypad bezel, antenna, battery, and battery cover as described in the procedures.

Removing and Replacing the Camera Module

1. Remove the battery cover, battery, antenna, keypad bezel, speaker cover, keyboard stiffener, flip assembly, transceiver board, flip display lens, flip assembly, flip assembly sleeve, flip knuckle, display bezel, and display assembly as described in the procedures.
2. Use the disassembly too to unseat the camera module connector from its socket on the display assembly (see Figure 20).

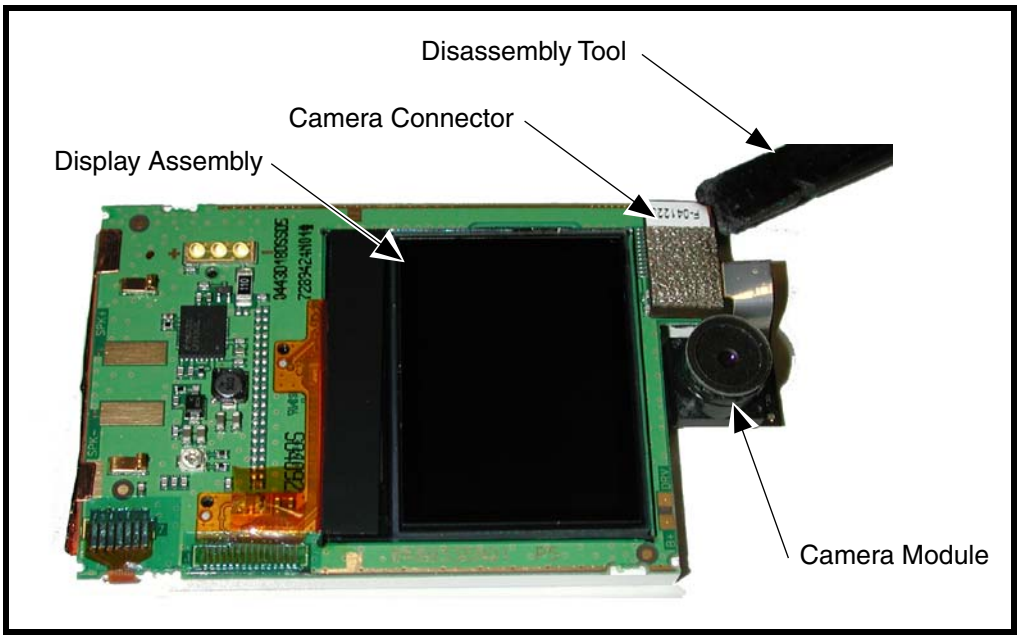
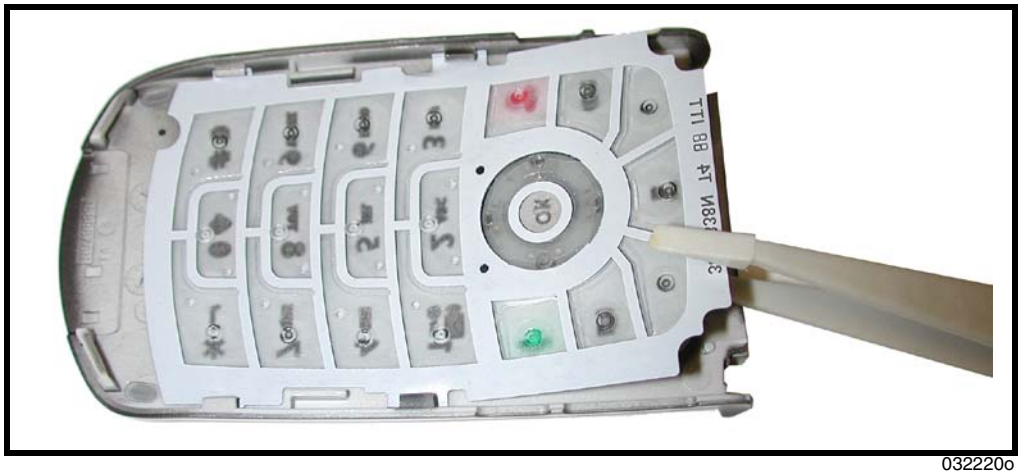


Figure 20. Removing the Camera Module

3. Carefully lift the camera module away from the display assembly.
4. To replace, align the camera module connector to its socket on the display assembly.
5. Carefully but firmly press the connector into the socket until properly seated.
6. Replace the display assembly, display bezel, flip knuckle, flip assembly sleeve, flip assembly, flip display lens, transceiver board, flip assembly, keyboard stiffener, speaker cover, keypad bezel, antenna, battery, and battery cover as described in the procedures.

Removing and Replacing the Keypad

1. Remove the antenna, battery cover, battery, rear housing assembly, flex connector, and transceiver board assembly as described in the procedures.
2. Use the plastic tweezers to lift the keypad from the front housing as shown in Figure 21.



032220o

Figure 21. Removing the Keypad

3. To replace, insert the keypad into the front housing, ensuring the keys align properly with the openings in the front housing.
4. Replace the transceiver board, rear housing assembly, antenna, battery, and battery housing as described in the procedures.

Removing the Motor/Vibrator Assembly

1. Remove the battery cover, battery, antenna, keypad bezel, speaker cover, keyboard stiffener, keypad flex, flip flex connector, transceiver board, flip assembly, flip display lens, flip sleeve, flip display bezel, display module assembly as described in the procedures.
2. Use the flat edge of the disassembly tool to remove the motor/vibrator assembly from the flip housing (see Figure 22).

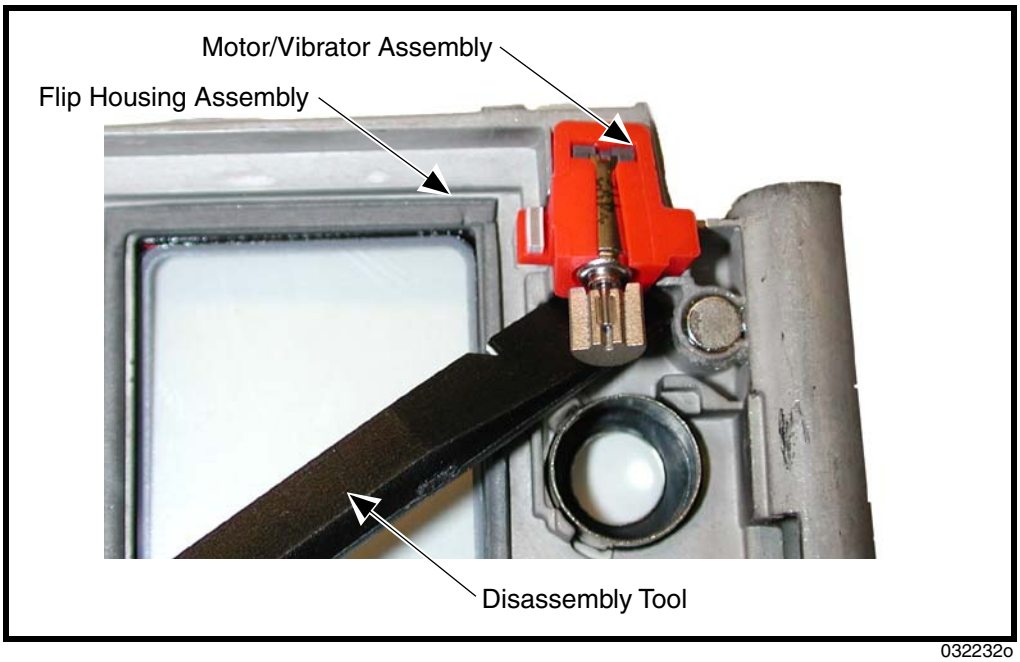
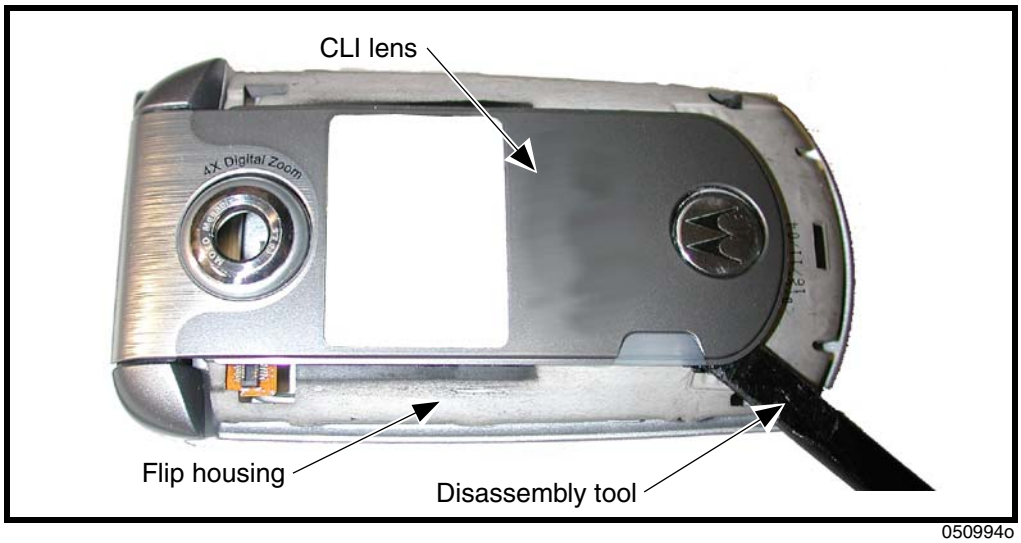


Figure 22. Removing the Motor/Vibrator Assembly

3. To replace, align the motor/vibrator assembly to its place in the flip housing assembly.
4. Carefully press the motor/vibrator assembly into position in the flip housing. Ensure that the motor/vibrator assembly is fully seated and the surface of the motor/vibrator assembly is flush with the outer plane of the flip housing. Ensure the motor/vibrator shaft turns freely.
5. Replace the display assembly, display bezel, flip knuckle, flip assembly sleeve, flip assembly, flip display lens, transceiver board, flip assembly, keyboard stiffener, speaker cover, keypad bezel, antenna, battery, and battery cover as described in the procedures.

Removing the CLI Lens and Camera Bezel

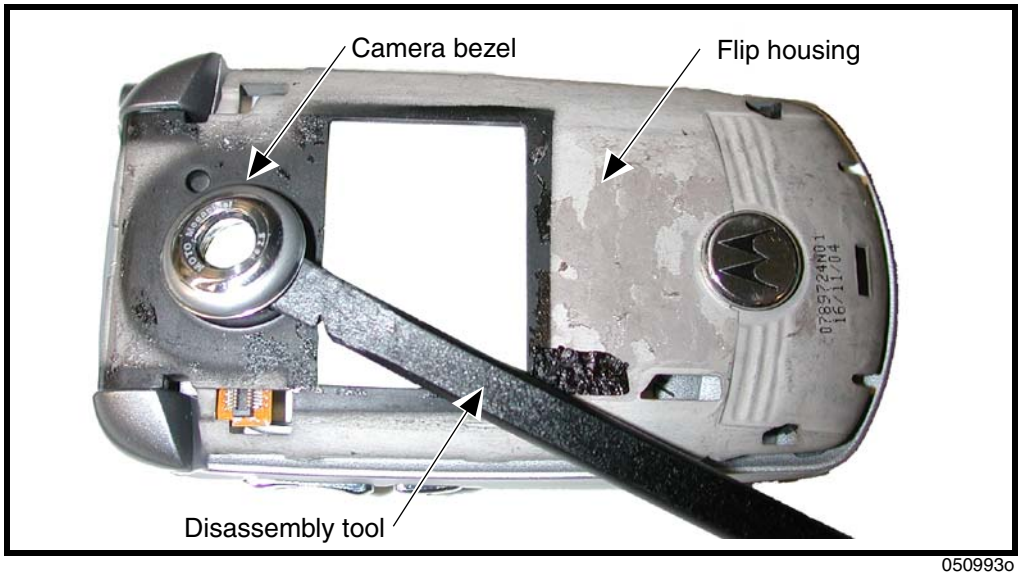
1. Remove the flip sleeve as described in the procedures.
2. Use the disassembly tool to pry the CLI lens away from the flip housing.



050994o

Figure 23. Removing the CLI Lens

3. Lift the CLI lens away from the flip housing and discard it.
4. Use the disassembly tool to pry the camera bezel away from the flip housing.



050993o

Figure 24. Removing the Camera Bezel

5. Lift the camera bezel away from the flip housing.
6. Remove any residual adhesive left from the foam gasket that held the bezel down.

7. To replace, expose the adhesive on the back of the new camera bezel and place the camera bezel onto the flip housing. Observe the notches on the bottom of the camera bezel. Press down on the camera bezel firmly to secure it to the flip housing.
8. Expose the adhesive on the back side of the new CLI lens.
9. Place the new CLI lens onto the flip housing and press down firmly to secure the adhesive to the housing.
10. Reassemble flip sleeve as described in the procedures.

Phone Identification

Personality Transfer

A personality transfer is required when a phone is express exchanged or when the main board is replaced. Personality transfers reproduce the customer's original personalized details such as menu and stored memory such as phone books, or even just program a unit with basic user information such as language selection.

Identification

Each Motorola CDMA phone is labeled with a variety of identifying numbers. Figure 25 describes the current identifying labels.

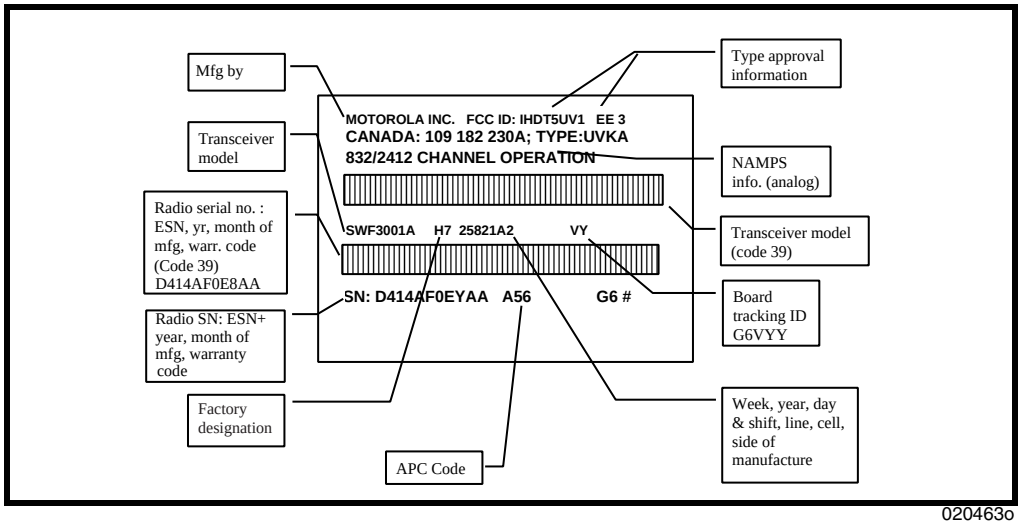

Mfg by
Transceiver model
Radio serial no. : ESN, yr, month of mfg, warr. code (Code 39) D414AF0E8AA
Radio SN: ESN+ year, month of mfg, warranty code
Factory designation
APC Code
Type approval information
NAMPS info. (analog)
Transceiver model (code 39)
Board tracking ID G6VYY
Week, year, day & shift, line, cell, side of manufacture
MOTOROLA INC. FCC ID: IHDT5UV1 EE 3
CANADA: 109 182 230A; TYPE:UVKA
832/2412 CHANNEL OPERATION
SWF3001A H7 25821A2 VY
SN: D414AF0EYAA A56 G6 #
020463o

Figure 25. CDMA Telephone Identification Label

Troubleshooting

Table 2. Level 1 and 2 Troubleshooting Chart

Symptom	Probable Cause	Verification and Remedy
1. Telephone will not turn on or stay on.	a) Battery either discharged or defective.	Measure battery voltage across a 50 ohm (>1 Watt) load. If the battery voltage is <3.25 Vdc, recharge the battery using the appropriate battery charger. If the battery will not recharge, replace the battery. If battery is not at fault, proceed to b.
	b) Battery connectors open or misaligned.	Visually inspect the battery connectors on both the battery and the telephone. Realign and, if necessary, either replace the battery or refer to a Level 3 Service Center for the battery connector replacement. If battery connectors are not at fault, proceed to c.
	c) Transceiver board defective.	Remove the transceiver board. Substitute a known good transceiver board and temporarily reassemble the unit. Press the PWR button; if unit turns on and stays on, disconnect the dc power source and reassemble the telephone with the new transceiver board. Verify that the fault has been cleared. If the fault has not been cleared then proceed to d.
	d) keyboard assembly failure.	Replace the keyboard assembly. Temporarily connect a +3.6 Vdc supply to the battery connectors. Depress the PWR button. If unit turns on and stays on, disconnect the dc power source and reassemble with the new keyboard assembly.
2. Telephone exhibits poor reception or erratic operation such as calls frequently dropping or weak or distorted audio.	a) Antenna assembly defective.	Check to make sure that the antenna pin is properly connected to the transceiver board assembly. If connected properly, substitute a known good antenna. If the fault is still present, proceed to b.
	b) Transceiver board defective.	Replace the transceiver board (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board.
3. Display is erratic, or provides partial or no display.	a) Connections to or from transceiver board defective.	Check general condition of flex and flex connector. If the flex and connector are good, check that the flex connector is fully connected. If not, check connector to transceiver board connections. If faulty connector, replace the transceiver board. If connector is not at fault, proceed to b.
	b) Flip assembly defective.	Temporarily replace the flip assembly with a known good assembly. If fault has been cleared, reassemble with the new flip assembly. If fault not cleared, proceed to c.
	c) Transceiver board assembly defective.	Replace the transceiver board (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board.
4. Incoming call alert transducer audio distorted or volume is too low.	Faulty transceiver board assembly.	Replace the transceiver board (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board.
5. Telephone transmit audio is weak. (usually indicated by called parties complaining of difficulty in hearing voice).	a) Microphone connections to the transceiver board assembly defective.	Gain access to the microphone as described in the procedures. Check connections. If connector is faulty proceed to c; if the connector is not at fault, proceed to b.

Table 2. Level 1 and 2 Troubleshooting Chart (Continued)

Symptom	Probable Cause	Verification and Remedy
	b) Microphone defective.	Gain access to microphone. Disconnect and substitute a known good microphone. Place a call and verify improvement in transmit signal as heard by called party. If good, reassemble with new microphone. If microphone is not at fault, reinstall original microphone and proceed to c.
	c) Transceiver board assembly defective.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
6. Receive audio from earpiece speaker is weak or distorted.	a) Connections to or from transceiver board assembly defective.	Gain access to the transceiver board assembly as described in the procedures. Check flex and the flex connector from the flip assembly to the transceiver board assembly. If flex is at fault, replace flip assembly. If flex connector is at fault, proceed to d. If connection is not at fault, proceed to b.
	b) Flip assembly defective.	Temporarily replace the flip assembly with a known good assembly. If fault has been cleared, reassemble with the new flip assembly. If fault not cleared, proceed to c.
	c) Antenna assembly defective.	Check to make sure the antenna is installed correctly. If the antenna is installed correctly, substitute a known good antenna assembly. If this does not clear the fault, reinstall the original antenna assembly and proceed to d.
	d) Transceiver board assembly defective.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble with the new transceiver board assembly.
7. Phone does not sense when flip is opened or closed (usually indicated by inability to answer incoming calls by opening the flip, or inability to make outgoing calls).	a) Flip assembly defective.	Temporarily replace the flip assembly with a known good assembly. If fault has been cleared, reassemble with the new flip assembly. If fault not cleared, proceed to b.
	b) Transceiver board assembly defective.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
8. Vibrator feature not functioning.	Transceiver board assembly defective.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
9. Internal Charger not working.	Faulty charger circuit on transceiver board assembly.	Test a selection of batteries in the rear pocket of the desktop charger. Check LED display for the charging indications. If these are charging properly, then the internal charger is at fault. Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
11. No or weak audio when using headset.	a) Headset not fully pushed home.	Ensure the headset plug is fully seated in the jack socket. If fault not cleared, proceed to b.
	b) Faulty jack socket on transceiver board assembly.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.

Programming: Software Upgrade and Flexing

Contact your local technical support engineer for information about equipment and procedures for flashing and flexing.

Exploded View Diagram

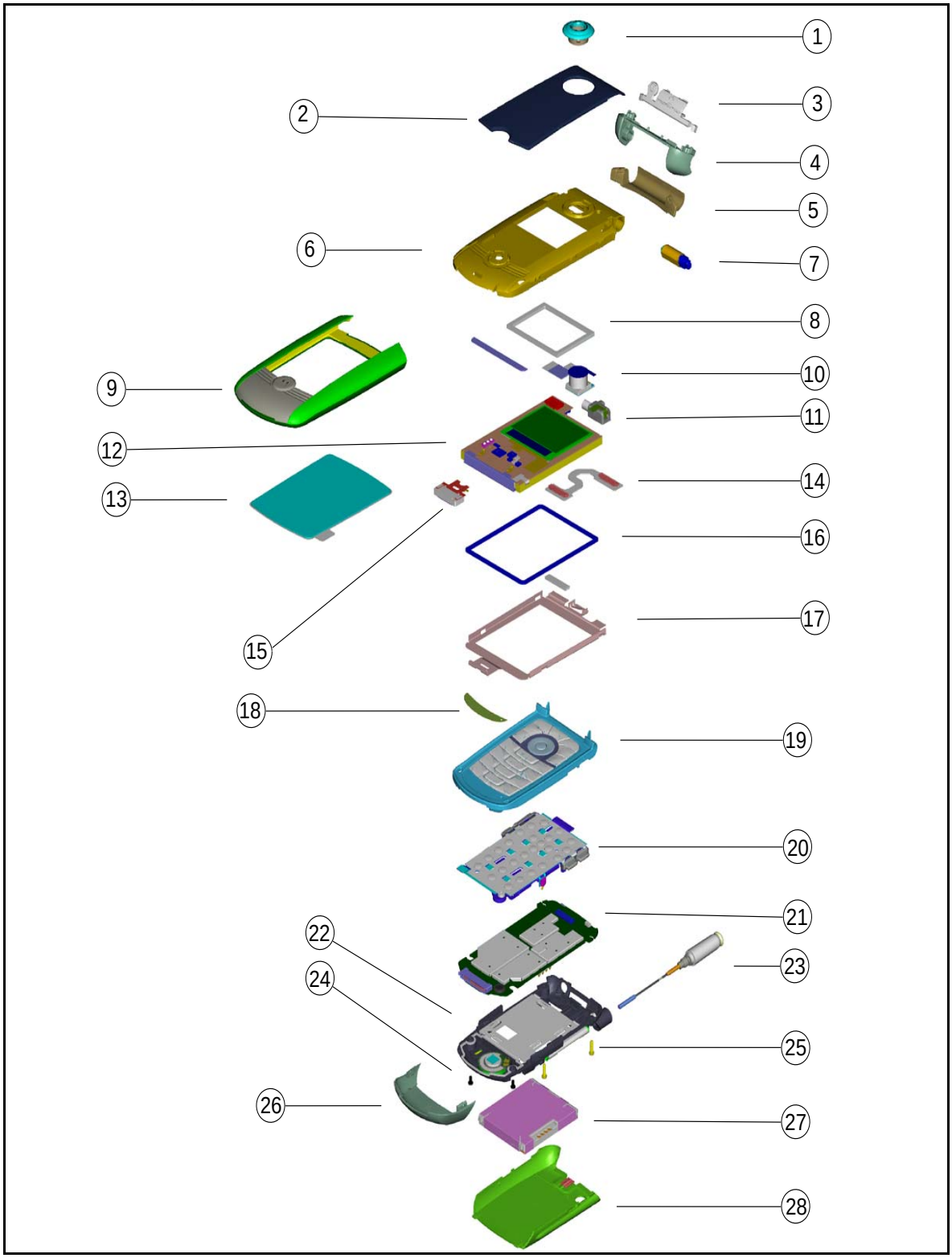


Figure 26. Exploded View

Exploded View Parts List

Table 3. E815 Parts List

Item Number	Motorola Part Number	Description	E816 Part number
1	1388892Y01	camera bezel	1388892Y02
2	6188259Y01 6188259Y02	Verizon CLI lens Non-branded CLI lens	6188259Y02
3	7589314N03	flip stop grommet	3871854C01
4	1589315N05	knuckles	1589315N06
5	1589875N03	Barrel cover	1589875N08
6	0789724N01	Magnesium frame	Same
7	5587736N01	Hinge assembly	Same
8	3289412N02	CLI display gasket	Same
9	1589892N02	Flip sleeve assembly	1589892N05
10	0171483B01	Camera assy	Same
11	5989943N01	Vibrator motor assy	Same
12	7289424N02	Display module	Same
13	6189690N10 6189690N09	Generic Main lens Verizon Main lens	6189690N10
14	8489450N03	Hinge flex	Same
15	8490009N03	Speaker assy	Same
16	3289413N04	Main display gasket	Same
17	0789349Y02	Display bezel assembly	Same
18	1389566N14	Generic Label	1389566N30
19	1589331N05	Keypad bezel assy	1589331N07
20	0187521Y06	keyboard assembly	0187521Y07
21		transceiver PC Board Assy	Same
22	0789414N03	Rear endo assy	0789415N05
23	8587488Y03	Antenna	8587488Y06
24	0389469N02	Screw, stiffener	Same
25	0387791L01	Screw, knuckle	0387791L04
26	1589318N04	Speaker cover	1589318N05
27	SNN5760A SNN5761A SNN5615A	battery 1030 mAh Verizon branded battery 1030mAh non branded battery 1440 mAh non branded	Same
28	SHN8842A SHN8837A SHN8734A	Non branded battery cover 1440 Non branded battery cover 1030 Verizon branded battery cover 1030	1587312Y09 1588887Y10 NA

There is a danger of explosion if the Lithium Ion battery pack is replaced incorrectly. Replace only with the same type of battery or equivalent as recommended by the battery manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Accessories

Table 4. Accessories

Description	Part Number
Power Solutions	
Battery Slim LiIon (1030mAh)	SNN5761A
Battery High Performance (1440mAh)	SNN5615A
Travel Charger Linear U.S.	SPN4992
Travel Charger Mid Rate U.S. New ID	SPN5037
Travel Charger Rapid U.S. (non-leakage)	SPN5049
In-Vehicle Solutions	
Bluetooth Car Kit	S9642
Self Install HF Retractable (Razorbill)	SYN0613
Professional Install Car Kit (Junction Box Only)	S9950
HUC for PCC	TBD
Low Tier VPA Mid rate	
VPA Verizon Exclusive Rapid	SYN9901
Vehicle Power Adapter, New ID Rapid	SYN0707
Audio & Connectivity	
Paladin Bluetooth Headset	SYN9826A
Caller ID Bluetooth Headset	TBD
Quadrant Bluetooth Speaker	TBD
Qwerty Bluetooth Keyboard	TBD
Platform Stereo Headset	TBD
FM Stereo Headset	SYN8609
Retractable Headset (new customizable)	SYN9050
One Touch Headset (new customizable)	SYN9351
Mono Headset Black	SYN8390B
Mono Headset Silver	AAYN4264A
Mono Headset (new customizable)	SYN9350
Over the Ear Headset	SYN8908
Neck Loop headset	SYN7875
T-Flash Card 16 mb	SYN0940
T-Flash Card 32 mb	SYN0941
T-Flash Card 64 mb	SYN0942
T-Flash card 128 mb	SYN0943
T-Flash Card (32 mb) and T-Flash to SD Adaptor in Jewel Case	SYN0941A
T-Flash to SD adaptor	SYN0893A
USB 2.0 Card Reader	SYN1045A
Mobile Phone Tools Phase II - USB	S9752B
Mobile Phone Tools Phase II - CD ROM	SVN4776B
Consumer Personalization	
Carry Cases	TBD
Lanyard	SYN9490A
Holster	TBD
Belt Clip	SYN8763

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